DOCUMENT RESUME

ED 251 211 PS 014 745

AUTHOR Miller, Michael D.
TITLE Childhood Obesity: Prediction and Prevention.
PUB DATE Mar 84
NOTE 35p.; Paper presented at the Annual Meeting of the Southeastern Psychological Association (New Orleans, LA, March, 1984).
PUB TYPE Information Analyses (070) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Children; *Etiology; Literature Reviews; *Obesity; *Predictor Variables; *Prevention; Research Needs; Research Problems; Theories
IDENTIFIERS Breastfeeding

ABSTRACT

Obesity in children is a problem both insidious and acute. Childhood obesity has been indicated as a forerunner of adult obesity; it is also an immediate problem for the child. Given the lack of evidence for long term maintenance of any weight loss, this paper investigates the etiology of the disorder as a prelude to prevention. Upon review of the psychological, pediatric, and nutritional literature, it was found that obesity in infancy or childhood does not predestine obesity in adulthood. However, there is a channeling tendency apparent from infancy that increases with age. Further, there is no current evidence to support any one theory (e.g., genetic, social learning) or mechanism (e.g., lower metabolism, overeating) as the cause of juvenile obesity. Findings in these areas are reviewed, and methodological flaws and disagreements hindering further understanding are cited. Finally, the discussion offers some preventive measures for subsequent investigation. (Author/RH)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

ED251211

Childhood Obesity: Prediction and Prevention

Michael D. Miller

University of Oklahoma
Health Sciences Center
Department of Psychiatry
and Behavioral Sciences
P.O. Box 26307
5SP153
Oklahoma City, Oklahoma 73126

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Michael D. Miller

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

*Presented at the annual meeting of the Southeastern Psychological Association, New Orleans, Louisiana, March, 1984.

PS 014745

Obesity in children is a problem both insidious and acute. Childhood obesity has been indicated as a forerunner to adult obesity; it is also more immediately problematic for the child. Given the lack of evidence for long-term maintenance of any weight loss, this paper attempted to investigate the etiology of the disorder as a prelude to prevention. Upon review of the psychological, pediatric and nutritional literature, it was found that obesity in infancy or childhood does not predestine obesity in adulthood. However, there is a channeling tendency apparent from infancy that increases with age. Further, there is no current evidence to support any one theory (e.g., genetic, social learning) or mechanism (e.g., lower metabolism, overeating) as the cause of juvenile obesity. This paper reviews these findings and cites the methodological flaws and disagreements hindering further understanding. Lastly, the paper offers some preventive measures for subsequent investigation.

*What follows is a text of an oral presentation delivered at the 1984 Annual Meeting of The Southeastern Psychological Association. The paper summarized the conclusions of a much longer monograph, not previously published. Therefore, the reader will note that there are no reference citations in the paper. Following the paper is a list of approximately 250 references which serve to reference the earlier monograph and can be considered as bibliographic material for the present paper.

Childhood Obesity:

Prediction and Prevention

Obesity in children is a problem both insidious and acute. Childhood obesity has been indicated as a forerunner to adult obesity with its concomitant medical complications. It is also more immediately problematic for the child. Obese youth have been determined to experience less acceptance from their peers and greater discrimination from significant adults, in addition to demonstrating poorer self-concepts and greater evidence of disturbed personality characteristics than their normal weight peers. Society's disdain for excess weight may discourage overweight children's participation in their peers' activities; severe obesity may physically and physiologically preclude it.

As for the treatment of obesity, there is little evidence for long term maintenance of any weight loss. As obesity remains resistant to intervention efforts, preventive efforts in early childhood may prove to be a more efficacious use of resources. This paper reviewed the literature on the development and course of obesity in childhood in an effort to provide a thorough explanation of the disorder in order to allow us to predict obesity as a means to prevent it.

A number of different areas were examined. For the sake of brevity, I will very briefly summarize the findings. First I would like to discuss some methodological considerations, then the developmental course of obesity before presenting a review of the etiology and then finishing with some indications for further research and prevention.

1. Methodology: The failure to settle on a generally agreed upon definition of obesity is the largest obstacle to concensus gathering in this field. There is no universally accepted criterion for the diagnosis of childhood obesity, perhaps largely because obesity is as much a question of fashion and personal opinion as science. As a consequence, it is rare to find two studies with the same operational definition for obesity or similar methodology to investigate it. Adipose tissue is present in everyone and is a continuous variable with no absolute division between health and disease. Thus, all definitions of obesity are arbitrary. The terms "overweight" and "obese" have been equated, distinguished quantitatively, qualitatively. Criteria for inclusion have been based on varying percent overweight, varying percentile levels of weight for height, sex, age, and combinations thereof. Also used are weight/height ratios and skin fold measurements of up to eight different sites, using calipers of differing pressures. And then we also have clinical judgment of obesity.

In sum, there is incredible diversity in operational definitions. As the field currently stands, very few studies can be truly compared to each other.

2. Developmental Course of Obesity: Here I reviewed prospective, retrospective, and cross-sectional studies of weight gain and weight attainment of children from prenatal development through birth, infancy, childhood, and adolescence.

Some Conclusions: Consideration of the studies reviewed reveals no substantial proof that obese babies become obese adults. In fact, there is not even presumptive evidence of any sort of early predestiny. It appears that women who are at least 50% overweight do have overweight babies at birth, as do women who gain an excessive amount of weight during pregnancy. Weight gain is a relatively more important influence on birth weight than is pregravida weight, but both exert influence. Interestingly, neither has an influence until the infant's thirty-fourth week of gestation.

The majority of fat babies do not become fat children, nor do those who grow rapidly in infancy. Overweight children, though, do tend to retain that status through adolescence and overweight adolescents are extremely liable to remain overweight as adults. Being overweight or obese early in life does significantly increase the risk of being fat as an adult and that risk increases with advancing age. But at no time does early obesity preclude return to normal weight status. Few fat babies become fat children. A large percentage of fat children do become fat adolescents, but not all do so. A greater percentage of fat adolescents become fat adults.

In turn, fat adults and adolescents may have been lean or overweight as children. Obesity at one age does not predestine obesity at a later age, but there is a channeling tendency apparent from infancy which becomes stronger with advancing age.

Etiology: I have broken this down artifically into three categories--Endogencus: which I define as out of control of the environment, Exogenous: which can be brought under the control of the environment, and then an Endogeny-Exogeny Interaction.

Endogeny

1. Genetics: The genetic theory has yielded conflicting data with no clear answer. Obesity does run in families which is no surprise. Mayer, fifteen years ago, reported that 7% of kids from normal weight parents are obese at age 18. If one parent is obese the percentage increases to 40%. If both parents are obese the chance of the child being obese at age 18 is 80%. There are twin studies, adoptee studies, sibling studies, monozygotic and dizygotic twin studies , twins reared together, apart, etc.

There is an inherent problem in genetic research on obesity. As Newman stated 50 years ago, what heredity can do, environment can do also. There is as yet no detectable difference between a supposedly genetic obesity and a supposedly acquired obesity. As a result, genetically average weight parents could become obese, yet pass on their average weight genes to their progeny who would then remain average weight. These ostensibly fat parents begetting lean children would falsely contradict a genetic hypothesis due to our inability to distinguish the two types of obesity (if they exist).

2. Basal Metabolic Rate (BMR): BMR is defined as the energy output of an individual under standard resting conditions. Unfortunately, BMR differs substantially among individuals (the BMR's of persons of the same sex, age and weight may vary up to 30%). There are equal numbers of obese and nonobese at the high and low ends of average. Thus, there is no evidence that the obese have significantly lower metobolic rate than normals.

3. Set Point: This theory holds that the body has a set point for weight and will defend it against excess energy intake or expenditure. Little research has been done with children so I can not speak very well to a set point theory here. However, the theory is a circular argument and is not testable as a proper theory until the mechanisms of detection, feedback and correction are clearly understood biochemically.

Exogeny

1. Caloric Intake: Certainly one of the most widespread assumptions about obesity is that fat people overeat. The need for empirical verification of this presumption is evident; the methods for pursuing it are problematic. Food intake must be measured with precision, yet the mechanism of measurement can not be so intrusive as to at all affect the eating behavior or reporting thereof. It should be expected that the precision of the measurement will be inversely related to the representativeness of the data. One additional problem is that humans do not attain energy balance from day to day. Rather, correlations between intake and expenditure do not surface before two to three days, and only approach unity over the course of two weeks.

Again, there are a number of methodologies -- covert and overt observation, prospective and retrospective self-reports of one- to seven-day duration, and weighing the baby or the bottles before and after a feed. None of these methods is completely satisfactory. Within the studies reviewed, there is almost no support for conclusion of significant over-consumption among obese groups. This is a reliable finding, given the number of supporting studies. Its validity, however, is questionable given the naive assumptions many of the experimenters accepted from their self-report data. That the obese do not eat a detectably larger amount of food than the non-obese does not prove that they did not eat more to become obese. Maintenance of obesity does not require great caloric excess.

If we take two ten-year-old boys, same height, one at the 50th percentile for weight (33 kg) and the second at the 90th percentile (44 kg), the lean boy requires 2300 calories per day. The obese boy requires 2600, only an extra 300. To keep his extra 25 pounds the latter boy only needs to eat an extra two glasses of milk or two slices of bacon per day. Had both boys been normal weight at age five, the obese boy would have had to average an extra 325 calories per week to put on the extra 25 pounds in five years.

The variation within a person's eating behavior exceeds that between persons. Attempting to measure intakes even by observation is flawed from the start by the plasticity in eating behavior and the variation within the same foods. For example, bacon is so varied in its fat content that the energy value

ranges from 355 to 612 calories/100 gm. Persons may put the same amount of dressing on salads, but leave different amounts unconsumed in the bottom of the bowl. Similar problems arise in determining the calories of fruit packed in syrup.

One hundred extra calories per day (a tablespoon of butter or margarine, two graham crackers, a glass of root beer, a pear) represent only 4-5% of the normal intake of a ten-year-old boy. In one year's time, this accumulates to over 10 lbs. In sum, the day-to-day excess in intake sufficient to effect weight gain over long periods is too small for the accuracy of the methods currently used to investigate it.

2. Breast Feeding Versus Bottle Feeding: The mother who breastfeeds does not know how much her infant is receiving and therefore is reliant on his apparent satiation to terminate feeding. The bottle feeding mother is constantly aware of how much milk her infant has consumed. Consequently, the potential for overfeeding is much greater in bottlefed than in breastfed infants.

Infants do have a strong intake regulatory mechanism. For the first six weeks of life infants regulate by volume. After six weeks they can regulate their calorie intake as well. There are also some compositional changes in mothers' milk from the beginning to end of a feed that may aid in appetite control mechanisms in the infant. But it is possible for parents to override this regulatory mechanism by at least 10 to 15 percent. There is a slight correlation between bottle feeding and obesity. But it appears to be a transient effect at best. Bottle feeding

does afford an opportunity to overfeed, an opportunity that breast feeding does not allow. But bottle feeding does not necessitate or even invite overfeeding. And breast feeding does not insulate against obesity later in life. If parents are incapable or unwilling to accept satiety cues from their child, then overfeeding has only been postponed.

3. Early Introduction of Solids: There is no medical or nutritional reason to introduce non-milk (beikost) into the diet of an infant prior to 4-6 six months of age. But this advice is almost totally unheard or unheeded in the population. Before four months of age, the infant lacks the necessary tongue movements to effectively ingest solid food. Before six months of age the infant lacks the musculature to sit up, lean forward, and open his mouth to indicate hunger or to lean back and turn away to indicate satiety. Until the infant attains this ability, attempted introduction of solid foods represents a type of forced feeding.

The findings here are similar to the breast feeding issue; early introduction of solids allows for the possibility of overfeeding. But, there is no evidence to show that a group of babies weaned at an earlier age develop obesity more frequently, more severely, or more quickly than a group of later weaned peers.

4. Energy Expenditure: Exercise is an issue similar to overeating; it is a popular belief, it is a parsimonious explanation, and it is equally difficult to validly measure. One additional difficulty involves interperson differences in basal

metobolic rate (BMR) between persons of the same size performing the same activity. Considering these factors though, again there is currently no evidence to indicate that relative inactivity either causes or maintains obesity. However, at least by adolescence, both overweight and normal weight children are markedly inactive.

ENDOGENY-EXOGENY INTERACTION

(This is understood to mean the environment acting on the organism at a critical or sensitive period).

1. Prenatal: As mentioned earlier, preconception weight and especially prenatal weight gain do influence weight at birth, but there are no lasting effects.

2. Cellularity: This theory maintains that the human body has a sensitive period during which adipose cell generation occurs. If overfeeding occurs during this time (early childhood) the number of cells will increase. Once cells are created, they can only decrease in size but not in number despite subsequent weight loss. After this sensitive period passes, fat storage, according to the theory, can only occur by an increase in cell size-hypertrophy- rather than in cell number-hyperplasia. Consequently, there ought to be two types of obesity; hypertrophic (small cell number, large cell size, onset in late childhood or adulthood) and hyperplastic (large cell number, small cell size, onset in early childhood).

There is some empirical support for this theory, but there are contradictory findings as well. Again, this area is plagued by methodological and mechanical problems when it comes to trying

to obtain, count, and measure adipocytes. Foremost is the inability to identify cells that are present, but contain no lipid material as these are translucent and thus indectable. For a theory that depends on being able to say that there are no cells there, when there may actually be empty ones waiting to be filled, this problem is a major one. The data indicate only that obesity in infancy leads to an earlier achievement of adult levels of fat cell size and number than in nonobese children. There is no evidence that obese children surpass normal adult levels without continued energy excess.

The disappointing conclusion to be drawn from a review of the literature on juvenile obesity is that there are no answers. Part of the problem lies in everyone asking different questions and no one agreeing on what constitutes obesity and how to measure it. Criteria for obesity, albeit arbitrary ones, must be settled upon.

In view of these findings, I question the advisability of further study in attempting to explain obesity. The precision required to detect the slightest energy imbalance capable of generating fat storage over time is presently unavailable with out current research tools. Continued work with twins, diet diaries, and activity reports is not likely to yield anything more than qualitatively indistinct additions to already existing data. Without substantial improvement in methodology, there is little point in seeking the explanation of juvenile obesity. Rather, I believe energy would be better invested in investigation of preventive measures.

To summarize the current research in the etiology of pediatric obesity: the mechanics are unavoidable - obesity occurs by a relative excess of energy intake over expenditure. How and why that happens is as yet undetermined.

PREVENTION

I offer ten suggestions for prevention generated from this review. None has ever been systematically investigated.

1. Closely monitor pregnancy weight gain, especially with women who are overweight.

2. Encourage breast feeding. Bottle feeding mothers should be cautioned against over-encouraging the infant to finish each bottle.

3. Instruct caregivers to identify satiety cues from their infants.

4. Instruct parents in proper nutrition.

5. Dispell all notion of the desirability of a fat baby.

6. Pediatricians should monitor infant and child weight gain, stressing the danger of excess weight.

7. Delay the introduction of solid foods into the infant's diet before 5-6 months of age.

8. Parents should model and reinforce physical exercise and activity.

9. Teach children to attend to their body's hunger signals rather than override them by cleaning their plates and eating when not hungry.

10. Teach children the value of normal weight and help them to accept responsibility for their own eating and activity levels.

DIRECTIONS FOR FURTHER RESEARCH

1. Agreement of operational definitions of obesity and overweight.

2. Reliability and validity studies on methods of measuring food intake and activity, and of methods of measuring skin folds and adipocyte cells.

3. Biochemical research to identify the messenger system in the cellularity and set point theories and the specific mode of genetic transmission if it exists. Also, development of small unobtrusive measures to record energy intake and expenditure, such as perhaps a small heat sensitive monitor that could be worn around the neck to measure caloric intake.

4. Longitudinal, normative studies of children's weight history: obesity pedigree, pregnancy weight gain, birth weight, method of feeding, weight and skin fold measurements at various ages, etc.

5. Micro-analysis of feeding styles of mothers of infants such as the work of Ainsworth and Bell (1969).

6. Concentration on research of obesity <u>prevention</u> rather than on prediction or post-hoc explanation.

Abraham, S., Collins, G., & Nordsieck, M. Relation of childhood weight status to morbidity in adults. Public Health Reports, 1971, 86, 273-284.

Abraham, S. & Nordsieck, M. Relation of excess weight in children and adults. Public Health Reports, 1960, 75, 263-273.

Ainsworth, M.D. & Bell, S.M. Some contemporary patterns of mother-infant interaction in the feeding situation. In A. Ambrose (Ed.), Stimulation in early infancy. New York: Academic Press, 1969.

American Academy of Pediatrics: Committee on Nutrition. Obesity in childhood. Pediatrics, 1967, 40, 454-467.

American Academy of Pediatrics: Committee on Nutrition. Nutritional aspects of obesity in infancy and childhood. Pediatrics, 1981, 68, 880-883.

American Academy of Pediatrics. The promotion of breastfeeding. Pediatrics, 1982, 69, 654-661.

Anderson, T.A. Commercial infant foods: Content and composition. Pediatric Clinics of North America, 1977, 24, 34-46.

Andrew, E.M., Clancy, K.L., & Katz, M.G. Infant feeding practices of families belonging to a prepaid group practice health care plan. Pediatrics, 1980, 65, 978-988.

Asher, P. Fat babies and fat children. Archives of Disease in Childhood, 1966, 41, 672-673.

Bakwin, H. Body-weight regulation in twins. Developmental Medicine and Child Neurology, 1973, 15, 178-183.

Barnes, L.A. Nutritional requirements of the full-term neonate. In R.M. Suskind (Ed.), Textbook of pediatric nutrition. New York: Raven Press, 1981.

Beal, V.A. On the acceptance of solid foods, and other food patterns, of infants and children. Pediatrics, 1957, 20, 448-452.

Bell, R.Q. Level of arousal in breastfed and bottlefed human newborns. Psychosomatic Medicine, 1966, 28, 677-680.

Bennett, W. & Gurin, J. Do diets really work? Science 82, 1982, 42-50.

Bernal, J. & Richards, M.P. The effects of bottle and breast feeding on infant development. Journal of Psychosomatic Research, 1970, 14, 247-252.

Birch, L.L. Effects of peer model's food choices and eating behaviors on preschoolers' food choices. Child Development, 1980, 51, 489-496.

Birch, L.L., Zimmerman, S.I., & Hind, H. The influence of social-affective context on the formation of children's food preferences. Child Development, 1980, 51, 856-861.

Biron, P., Mongeau, J.G., & Bertrand, D. Familial resemblance of body weight and weight/height in 374 homes with adopted children. The Journal of Pediatrics, 1977, 91, 555-558.

Bonnet, F.P. The regional growth of adipose tissue in normal and obese children. In E. Cacciari, Z. Laron, & S. Raiti (Eds.), Obesity in childhood. London: Academic Press, 1978.

Börjeson, M. The aetiology of obesity in children. Acta Paediatrica Scandinavica, 1976, 65, 279-287.

Börjeson, M. Prevention of obesity in childhood. In E. Caccairi, Z. Laron, & S. Raiti (Eds.), Obesity in childhood. London: Academic Press, 1978.

Bowering, J., Lowenberg, R.L., Morrison, M.A., Parker, S.L., & Tinado, N. Infant feeding practices in East Harlem. Journal of the American Dietetic Association, 1978, 72, 148-155.

Bradfield, R.B., Paulos, J., & Grossman, L. Energy expenditure and heart rate of obese high school girls. American Journal of Clinical Nutrition, 1971, 24, 1482-1488.

Bronstein, I.P. Obesity in childhood: Psychological studies. American Journal of Diseases of the Child, 1942, 63, 283-301.

Brook, C.G. Determination of body composition of children from skinfold measurements. Archives of Disease in Childhood, 1971, 46, 182-184.

Brook, C.G. Evidence for a sensitive period in adipose cell replication in man. The Lancet, 1972, 2, 625-627.

Brook, C.G. The role of genetic and environmental factors in the determination of body fat in man. In E. Cacciani, Z. Laron, & S. Raiti (Eds.), Obesity in childhood. London: Academic Press, 1978.

Brook, C.G., Huntley, R.M., & Slack, J. Influence of heredity and environment in determination of skinfold thickness in children. British Medical Journal, 1975, 2, 719-721.

Brook, C.G. & Lloyd, J.K. Adipose cell size and glucose tolerance in obese children and effects of diet. Archives of Disease in Childhood, 1973, 48, 301-304.

Brook, C.G., Lloyd, J.K., & Wolf, O.H. Relation between age of onset of obesity and size and number of adipose cells. British Medical Journal, 1972, 1, 25-27.

Brown, G.W., Tuholski, J.M., Sauer, L.W., Minsk, L.D. & Rosentern, I. Evaluation of prepared milks for infant nutrition. Journal of Pediatrics, 1960, 56, 391-398.

Bruch, H. Obesity in childhood. American Journal of Diseases of Children, 1939, 58, 457-484.

Bruch, H. The importance of overweight. New York: W.W. Norton & Co., 1957.

Bruch, H. Eating disorders. New York: Basic Books, 1973.

Bullen, B.A., Reed, R.B., & Mayer, J. Physical activity of obese and nonobese adolescent girls appraised by motion picture sampling. American Journal of Clinical Nutrition, 1964, 14, 211-223.

Chan, S.K. The effect of nutrient density change and nutrient content upon infants' intake and feeding behavior. Dissertation Abstracts International, 1978, 38, 5301B-5302B.

Chan, S., Pollitt, E., & Leibl, R. Effects of nutrient cues on formula intake in 5-week-old infants. Infant Behavior and Development, 1979, 2, 201-208.

Charney, E., Goodman, H.C., McBride, M., Lyon, B., Pratt, R. Childhood antecedents of adult obesity. The New England Journal of Medicine, 1976, 295, 6-9.

Clark, A.L. & Affonso, D.D. Childbearing. Philadelphia: F.A. Davis, 1976.

Coates. T.J. & Thoreson, C.E. Treating obesity in children and adolescents: A review. American Journal of Public Health, 1978, 68, 143-151.

Consolazio, C.F. &Johnson, H.L. Measurement of energy cost in humans. Federation Proceedings, 1971, 30, 1444-1453.

Corbin, C.B. & Pletcher, P. Diet and physical activity patterns of obese and nonobese elementary school children. Research Quarterly, 1968, 39, 922-928.

Contanzo, P.R. & Woody, E.Z. Externality as a function of obesity in children: Pervasive style or eating-specific attribute? Journal of Personality and Social Psychology, 1979, 37, 2286-2296.

Crawford, P.P., Hankin, J.H. & Huenemann, R.L. Environmental factors associated with preschool obesity. Journal of the American Dietetic Association, 1978, 72, 589-596.

Crawford, P.B., Keller, C.A., Hampton, M.C., Pacheo, F.P. & Huenemann, R.L. An obesity index for six-month-old children. American Journal of Clinical Nutrition, 1974, 27, 706-711.

Crisp, A.H., Douglas, J.W.B., Ross, J.M., & Stonehill, E. Some developmental aspects of weight. Journal of Psychosomatic Research, 1970, 14, 313-320.

Crook, C.K. Taste perception in the newborn infant. Infant Behavior and Development, 1978, 1, 52-69.

Crook, C.K. & Lipsitt, L.P. Neonatal nutritive sucking: Effects of taste stimulation upon sucking rhythm and heart rate. Child Development, 1976, 47, 518-522.

Davies, D.P., Gray, O.P., Elwood, P.C., Hopkinson, C., & Smith, S. Effects of solid foods on growth of bottle-fed infants in first three months of life. British Medical Journal, 1977, 1, 7-8.

Davis, H.V., Sears, R.R., Miller, H.C., & Brodbeck, A.J. Effects of cup, bottle, and breastfeeding on oral activities of newborn infants. Pediatrics, 1948, 2, 549-558.

DeCarvalho, M. Frequent breastfeeding improves milk production and infant weight gain. Presented at the American Pediatric Society, Wasington, D.C., May 1982.

Desor, J.A., Maller, O., & Turner, R.E. Taste in acceptance of sugars by human infants. Journal of Comparative and Physiological Psychology, 1973, 84, 496-501.

DeSwiet, M. & Fayers, P. Effect of feeding habit on weight in infancy. The Lancet, 1977, 2, 892-894.

DiNatale, B., Bregani, P., & Carbone. A. Investigations preliminary to devising a program[illegible]r prevention of childhood obesity. In E. Cacciari, Z. Laron, & S. Raiti (Eds.), Obesity in childhood. London: Academic Press, 1978.

Dine, M.S., Gartside, P.S., Glueck, C.J., Rheines, L., Greene,G., & Khoury, P. Where do the heaviest children come from? A prospective study of white children from birth to five years of age. Pediatrics, 1979, 63. 1-7.

Dorea, J.G., Horner, M.R., & Bezzara, V.L. Correlation between changeable human milk constituents and milk intake in breast-fed babies. Journal of Pediatrics, 1982, 101, 80-83.

Doyard, P.A., Chaussain, J.L., & Job, J.C. Adipose tissue cellularity and hormonal data in obese children. In E. Cacciari, Z. Laron, & S. Raiti (Eds.), Obesity in childhood. London: Academic Press, 1978.

Drabman, R.S., Cordva, G.D., Hammer, D., Jarvie, G.J., & Horton, W. Developmental trends in eating rates of normal and overweight preschool children. Child Development, 1979, 50, 211-216.

Drabman, R.S., Hammer,D., & Jarvie, G.J. Eating rates of elementary school children. Journal of Nutritional Education, 1977, 9, 80-82.

DuBois,S., Hill, D.E., & Beaton, G.H. An examination of factors believed to be associated with infantile obesity. American Journal of Clinical Nutrition, 1979, 32, 1997-2004.

Dugdale, A.E. Pattern of fat and lean tissue deposition in children. Nature, 1975, 256, 725-726.

Durnin, J.V., Lonergan, M.E., Good, J., & Ewan, A. A cross-sectional nutritional and anthropometric study, with an interval of seven years, 611 young adolescent school children. British Journal of Nutrition, 1969, 32, 169-179.

Edelman, B. & Maller, O. Facts and fictions about infantile obesity. International Journal of Obesity, 1982, 6, 69-81.

Eid, E.E. Follow-up study of physical growth of children who had excessive weight gain in first six months of life. British Medical Journal, 1970, 2, 74-76.

Engen, T., Lipsitt, L.P., & Peck, M.B. Ability of newborn infants to discriminate sapid substances. Developmental Psychology, 1974, 10, 741-744.

Engen, T., Lipsitt, L.P., & Robinson, D.O. The human newborn's sucking behavior for sweet fluids as a function of birth weight and maternal weight. Infant Behavior and Development, 1978, 1, 118-121.

Epstein, L.H., Parker, L., McCoy, J.F., & McGee, G. Descriptive analysis of eating regulation in obese and nonobese children. Journal of Applied Behavioral Analysis, 1976, 9, 407-415.

Fabsitz, R.R., Garrison, R.J., Feinleib, M., & Hjortland, M. A twin analysis of dietary intake: Evidence for a need to control for possible environmental differences in monozygotic and dizygotic twins. Behavior Genetics, 1978, 8, 15-25.

Farber, S.L. Identical twins reared apart: A reanalysis. New York: Basic Books, Inc., 1981.

Ferris, A.G., Beal, V.A., Laus, M.J., & Hasmer, D.W. The effect of feeding on fat deposition in early infancy. Pediatrics, 1979, 64, 397-401.

Ferris, A.G., Vilhjalnsdottir, L.B., Beal, V.A., & Pellett P.L. Diets in the first six months of infants in western Massachusetts. Journal of the American Dietetic Association, 1978, 72, 155-163.

Fisch, R.O., Bilek, M.K., & Ulstron, R. Obesity and leanness at birth and their relation to body habits in later childhood. Pediatrics, 1975, 56, 521-528.

Fischbein, S. Heredity-environment interaction in the development of twins. International Journal of Behavioral Development, 1978, 1, 313-322.

Fomon, S.J. Body composition of the male reference infant during the first year of life. Pediatrics, 1966, 40, 863-870.

Fomon, S.J. Infant nutrition (2nd ed.). Philadelphia: S.B. Saunders Co., 1974.

Fomon, S.J. What are infants fed in the United States? Pediatrics, 1975, 56, 350-354.

Fomon, S.J. Factors influencing food consumption in the human infant. International Journal of Obesity, 1980, 4, 348-350.

Fomon, S.J., Filer, L.J., Anderson, T.A., & Ziegler, E.E. Recommendations for feeding normal infants. Pediatrics, 1979, 63, 52-59.

Fomon, S.J., Filer, L.J., Thomas, L.N., Rogers, R.R., & Proksch, A. Relation between formula concentration and rate of growth or normal infants. Journal of Nutrition, 1969, 98, 241-254.

Fomon, S.J., Owen, G.M., & Thomas, L.N. Milk formula volume ingested by infants fed ad libitum. American Journal of Diseases of the Child, 1964, 108, 601-604.

Food and Nutrition Board. Fetal and infant nutrition and susceptibility to obesity. American Journal of Clinical Nutrition, 1978, 31, 2026-2030.

Forbes, G.B. Lean body mass and fat in obese children. Pediatrics, 1964, 34, 308-314.

Foreyt, J.P. & Goodrick, G.K. Childhood obesity. In E.J. Mash & L.G. Terdal (Eds.), Behavioral assessment of childhood disorders. New York: Guilford Press, 1981.

Foreyt, J.P, Goodrick, G.K., & Gotte, A.M. Limitations of behavioral treatment of obesity: Review and analysis. Journal of Behavioral Medicine, 1981, 4, 159-174.

Garn, S.M., Bailey, S.M., & Cole, P.E. Synchronous fatness changes in husbands and wives. American Journal of Clinical Nutrition, 1979, 32, 2375-2377.

Garn, S.M., Bailey, S.M., & Higgins, I.T. Fatness similarity in adopted pairs. American Journal of Clinical Nutrition, 1976, 29, 1067-1068.

Garn, S.M. & Clark, D.C. Nutrition, growth, development, and maturation: Findings from the Ten-State Nutrition Survey of 1968-1970. Pediatrics, 1975, 56, 306-319.

Garn, S.M. & Clark, D.C. Trends in fatness and the origins of obesity. Pediatrics, 1976, 57, 443-456.

Garn, S.M., Larkin, F.A., & Cole, P.E. The problem with one-day dietary intakes. Ecology of Food and Nutrition, 1976, 5, 245-247.

Garrow, J.S. Energy balance and obesity in man. New York: North Holland Publishing, 1974.

Griffiths, M. & Payne, P.R. Energy expenditure in small children of obese and non-obese parents. Nature, 1976, 260, 698-700

Grinker, J. Behavioral and metabolic consequences of weight reduction. Journal of the American Dietetic Association, 1973, 62, 30-34.

Grinker, J.A., Price, J.M., & Greenwood, M.R. Studies of taste in childhood obesity. In D. Novin, W. Wyrwicka, & G. Bray (Eds.), Hunger: Basic mechanisms and clinical implications. New York: Raven Press, 1976.

Guthrie, H.A. Effect of early feeding of solid foods on nutritive intake of infants. Pediatrics, 1966, 38, 879-885.

Häger, A., Sjöström, L., Arvidson, B., Björntorp, P , & Smith, U. Adipose tissue cellulosity in obese school girls before and after dietary treatment. American Journal of Clinical Nutrition. 1978, 31, 68-75.

Häger, A., Sjöström, L., Arvidsson, B., Björntörp, P., & Smith, U. Body fat and adipose tissue cellularity in infants: A longitudinal study. Metabolism, 1977, 26, 607-614.

Hall, B. Changing composition of human milk and early development of an appetite control. The Lancet, 1975, 2, 779-781.

Hammar, S.L., Campbell, M.M., Campbell, V.A., Moores, N.L., Sareen, C., Gareis, F.J., & Lucas, B. An interdisciplinary study of adolescent obesity. The Journal of Pediatrics, 1972, 80, 373-383.

Hampton, M.C., Huenemann, R.L., Shapiro, L.R., & Mitchell, B.W. Caloric and nutrient intakes of teenagers. Journal of the American Dietetic Association, 1967, 50, 385-396.

Harrison, G.G., Udall, J.N., & Morrow, G. Maternal obesity in pregnancy and infant birth weight. American Journal of Obstetrics and Gynecology, 1980, 136, 411-412.

Hartz, A., Giefer, E., & Rimm, A.A. Relative importance of family environment and heredity on obesity. Annals of Human Genetics, 1977, 41, 185-193.

Hawk, L.J., & Brook, C.G. Influence of body fatness in childhood on fatness in adult life. British Medical Journal, 1979, 1, 151-152.

Hawkins, R.C. A diathesis-stress model for the study of psychosocial risks: The prediction of infantile obesity. In D.B. Sawin, R.C. Hawkins, L. Olszewski, & J.N. Penticuff (Eds.), The exceptional infant (Vol. 4). New York: Bruner-Mayel, Inc., 1980.

Heald, F.P., & Hollander, R.J. The relation between obesity in adolescence and early growth. The Journal of Pediatrics, 1965, 67, 35-38.

Held, M.L., & Snow, D.L. MMPI, internal-external control, and problem check list scores of obese adolescent females. Journal of Clinical Psychology, 1972, 28, 523-525.

Hendry, L.B., & Gillies, P. Body type, body esteem, school and leisure: A study of overweight, average and underweight adolescents. Journal of Youth and Adolescence, 1978, 7, 181-195.

Hillman, R.W. Infant feeding patterns and oral habits of overweight children. American Journal of Clinical Nutrition, 1963, 13, 326-330.

Hirsch, J. Can we modify the number of adipose cells? Postgraduate Medicine, 1972, 51, 83-86.

Hirsch, J. Cell number and size as a determinant of subsequent obesity. In M. Winick (Ed.), Childhood obesity. New York: John Wiley & Sons, 1975.

Hirsch, J. & Knittle, J.L. Cellularity of obese and nonobese human adipose tissue. Federation Proceedings, 1970, 29, 1516-1521.

Hoffman, R.H. Obesity in childhood and adolescence. American Journal of Clinical Nutrition, 1957, 5, 1-10.

Huenemann, R.L. Environmental factors associated with preschool obesity. Journal of the American Dietetic Association, 1974, 64, 480-487.

Huenemann, R.L., Shapiro, L.R., Hampton, M.C., & Mitchell, B.W. Teen-agers' activities and attitudes toward activity. Journal of the American Dietetic Association, 1967, 51, 433-440.

Hutchinson-Smith, B. Skinfold thickness in infancy in relation to birht weight. Developmental Medicine and Child Neurology, 1973, 15, 628-634.

Hytten, F.E. Clinical and chemical studies in human lactation. British Medical Journal, 1954, 1, 175-179.

Illingsworth, R.S., Harvey, C.C., & Gin, S.Y. Relationship of birth weight to physical development in children. The Lancet, 1949, 2, 598-602.

Jeffrey, D.B. & Lemnitzer, N. Diet, exercise, obesity, and related health programs: A macroenvironmental analysis. In J.M. Ferguson & C.T. Barr (Eds.), The comprehensive handbook of behavioral medicine (vol. 2). New York: Spectrum Publications, 1981.

Jelliffe, D.B. Infantile overnutrition. British Medical Journal, 1973, 2, 546-552.

Johnson, M.L., Burke, B.S., & Mayer, J. Relative importance of inactivity and overeating in the energy balance of obese high school girls. American Journal of Clinical Nutrition, 1956, 4, 37-44.

Jung, R.T., Robinson, M.P., Gurr, M.I., & James, W.P.T. Does adipose hypercellularity in obesity exist? British Medical Journal, 1978, 2, 319-321.

Karpowitz, D.H. & Zeis, F.R. Personality and behavior differences of obese and nonobese adolescents. Journal of Consulting and Clinical Psychology, 1975, 43, 886-891.

Keane, T.M., Geller, S.E., & Scheirer, C.J. A parametric investigation of eating styles in obese and nonobese children. Behavior Therapy, 1981, 12, 280-286.

Kessen, W. Signs of risk of obesity in newborn babies. International Journal of Obesity, 1980, 4, 341-347.

Khan, M.A., Ashman, R.S., Heald, F.P., & Hubbard, T.B. Effects of methodology on estimation of adipose cell size and number in humans. Nutrition Reports International, 1974, 10, 9-18.

Kirtland, J., & Gurr, M.I. Adipose tissue cellularity: A review, 2. The relationship between cellularity and obesity. (England) International Journal of Obesity, 1979, 3, 15-55.

Knittle, J.L. Childhood obesity. Bulletin of the New York Academy of Medicine, 1971, 47, 579-589.

Knittle, J.L. Obesity in childhood: A problem in adipose tissue cellular development. The Journal of Pediatrics, 1972, 81, 1048-1059.

Knittle, J.L., Merritt, R.J., Dixon-Shanies, D., Ginsberg-Fellner, F., Timmers, K.I., & Katz, D.P. Childhood obesity. In R.M. Suskind (Ed.), Textbook of pediatric nutrition. New York: Raven Press, 1981.

Knittle, J.L., Timmers, K., Ginsberg-Fellner, F., Brown, R.E., & Katz, D.P. The growth of adipose tissue in children and adolescents. Journal of Clinical Investigation, 1979, 63, 239-246.

Korner, A.F., Hutchinson, C.A., Koperski, J.A., Kraemer, H., & Schneider, P.A. Stability of individual differences of neonatal motor and crying patterns. Child Development, 1981, 52, 83-90

Krantz, D.S. The social context of obesity research: Another perspective on its place in the field of social psychology. Personality and Social Psychology Bulletin, 1978, 4, 177-184.

The Lancet. Infant and adult obesity. The Lancet, 1974, 1, 17-18.

Laron, Z., Bendan, I., Shrem, I., Dickerman, Z., & Laros, P. Puberty in simple obese boys and girls. In E. Cacciari, Z. Laron, & S. Raiti (Eds.), Obesity in childhood. London: Academic Press, 1978.

Lasky, P.A. & Eichelburger, K.M. Implications, considerations, and nursing interventions of obesity in neonatal and preschool patients. Nursing Clinics of North America, 1982, 17, 199-205.

Lloyd, J.K., Wolf, O.H., Whelen, W.S. Childhood obesity: A long-term study of height and weight. British Medical Journal, 1961, 2, 145-148.

Mack, R.W. & Johnson, F.E. The relation between growth in infancy and growth in adolescence: Report of a longitudinal study among urban black adolescents. Human Biology, 1976, 48, 693-711.

Mack, R.W. & Kleinhenz, M.E. Growth, caloric intake, and activity levels in early infancy: A preliminary report. Human Biology, 1974, 46, 345-354.

Maino, C., Sarno, B.L., & Finocchi, G. Psychological aspects of infantile obesity. In E. Caccairi, Z. Laron, & S. Raiti (Eds.), Obesity in childhood. London: Academic Press, 1978.

Marston, A.R., London, P., & Cooper, L.M. A note on the eating behavior of children varying in weight. Journal of Child Psychology and Psychiatry, 1976, 17, 221-224.

Martinez, G.A., Dodd, D.A., & Samartgedes, J.A. Milk feeding patterns in the United States during the first 12 months of life. Pediatrics, 1981, 68, 863-868.

Mason, E. Obesity in pet dogs. The Veterninary Record, 1970, 86, 612-616.

Mayer, J. Genetic factors in human obesity. Annals of the New York Academy of Sciences, 1965, 131, 412-421.

Mayer, J. Overweight: Causes, cost and control. Englewood Cliffs, New Yersey: Prentice-Hall, 1968.

Mayer, J. Obesity during childhood. In M. Winick (Ed.), Childhood obesity. New York: John Wiley & Sons, 1975

Mellbin, T. & Vuille, J.C. Relation of weight gain in infancy to subcutaneous fat and relative weight at 10½ years of age. British Journal of Preventive and Social Medicine, 1976, 30, 239-243.

Mendelson, M. Psychological aspects of obesity. Medical Clinics of North America, 1964, 48, 1373-1385.

Meyer, A.J. & Henderson, J.B. Multiple risk factor reduction in the prevention of cardiovascular disease. Preventive Medicine, 1974, 3, 225-236.

Milstein, R.M. Responsiveness in newborn infants of normal weight and overweight parents. Dissertation Abstracts International, 1978, 38, 2478B-2479B

Mittleman, R.S. What is proper food for human infants? Pediatrics, 1980, 65, 370-371

Monello, L.F. & Mayer, J. Obese adolescent girls; An unrecognized "minority" group? American Journal of Clinical Nutrition, 1963, 13, 35-39.

Moore, M.E., Pond, J., & Korslund, M.K. Energy expenditure of pre-adolescent girls. Journal of the American Dietetic Association, 1966, 49, 409-412.

Morris, W. & Chinn, S. Weight-for-height as a measure of obesity in English children 5 to 11 years old. International Journal of Obesity, 1981, 5, 359-366.

Mossberg, H.O. Obesity in children. Acta Paediatrica Scandinavica, 1948, 35, Supplementum II, 1-125.

Mullins, A.G. The prognosis in juvenile obesity. Archives of Disease in Childhood, 1958, 33, 307-314.

Naeye, R.L., Blanc, W., & Paul, C. Effects of maternal nutrition on the human fetus. Pediatrics, 1973, 52, 494-503.

Nelson, R.A., Anderson, L.F., Gastineau, C.F., Hayles, A.B., & Stamnes, C.L. Physiology and natural history of obesity. Journal of the American Medical Association, 1973, 223, 627-630.

Neumann, C.G. & Alpaugh, M. Birthweight doubling time: A fresh look. Pediatrics, 1976, 57, 469-473.

Newman, H.H., Freeman, F.N., & Holzinger, K.J. Twins: A study of heredity and environment. Chicago: University of Chicago Press, 1937.

Nisbett, R.E. & Gurwitz, S.B. Weight, sex, and the eating behavior of human newborns. Journal of Comparative and Physiological Psychology, 1970, 73, 245-253.

Noppa, H., Bengtsson, C., Isaksson, B., & Smith, U. Adipose tissue cellularity in adulthood and its relation to childhood obesity. International Journal of Obesity, 1980, 4, 253-263.

Novin, D., Wyrwicka, W., & Bray, G. Hunger: Basic mechanisms and clinical implications. New York: Raven Press, 1976.

Oates, R.K. Infant feeding practices. British Medical Journal, 1973, 2, 762-764.

Osofsky, H.J. & O'Connell, E.J. Nutritional factors in pregnancy affecting fetal growth and subsequent infant development. In R.M. Suskind (Ed.), Textbook of pediatric nutrition. New York: Raven Press, 1981.

Ounstead, M. & Sleigh, G. The infant's self-regulation of food intake and weight gain: Differences in metabolic balance after growth constraint or acceleration in utero. The Lancet, 1975, 1, 1393-1397.

Ounstead, M. & Taylor, M.E. The postnatal growth of children who were small-for-dates or large-for-dates at birth. Developmental Medicine and Child Neurology, 1971, 13, 421-434.

Pediatrics. Why and how are children fat? Pediatrics, 1964, 34, 303-307.

Pipes, P. When should semi-solid foods be fed to infants? Journal of Nutritional Education, 1977, 9, 57-59.

Pisacano, J.C., Lichter, H., Ritter, J., & Siegal, A.P. An attempt at prevention of obesity in infancy. Pediatrics, 1978, 61, 360-364.

Poskitt, E.M. Overfeeding and overweight in infancy and their relation to body size in early childhood. Nutrition and Metabolism, 1977, 21, 54-55.

Poskitt, E.M. & Cole, T.J. Do fat babies stay fat? British Medical Journal, 1977, 1, 7-9.

Poskitt, E.M. & Cole, T.J. Nature, nurture, and childhood overweight. British Medical Journal, 1978, 1, 603-605.

Ravelli, G.P., Stein, Z.A., Susser, M.W. Obesity in young men after famine exposure in utero and early infancy. New England Journal of Medicine, 1976, 295, 349-353.

Rimm, I.J. & Rimm, A.A. Association between juvenile onset obesity and severe adult obesity in 73,532 women. American Journal of Public Health, 1976, 66, 479-481.

Rodin, J. & Slochower, J. Externality in the nonobese: Effects of environmental responsiveness on weight. Journal of Personality and Social Psychology, 1976, 33, 338-344.

Rodin, J., Slochower, J. & Fleming, B. Effect of degree of obesity, age of onset, and weight loss on responsiveness to sensory and external stimuli. Journal of Comparative and Physiological Psychology, 1977, 91, 586-597.

Rose, H.E. & Mayer, J. Activity, caloric intake, fat storage, and the energy balance of infants. Pediatrics, 1968, 41, 18-29.

Salans, L.B., Cushman, S.W., Weismann, R.E. Adipose cell size and number in nonobese and obese patients. The Journal of Clinical Investigation, 1973, 52, 929-941.

Sallade, J. A comparison of the psychological adjustment of obese vs. nonobese children. Journal of Psychosomatic Research, 1973, 17, 89-96.

Seltzer, C.C. & Mayer, J. Body build and obesity--Who are the obese? Journal of the American Medical Association, 1964, 189, 677-686.

Seltzer, CC. & Mayer, J. A review of genetic and constitutional factors in human obesity. Annals of the New York Academy of Sciences, 1966, 134, 688-695.

Shenker, I.R., Fisichelli, V., & Lang, J. Weight differences between foster infants of overweight and nonoverweight foster mothers. Journal of Pediatrics, 1974, 84, 715-718.

Shields, J. Monozygotic twins brought up apart and brought up together. New York: Oxford University Press, 1962.

Shukla, A., Forsyth, H.A., Anderson, C.M. & Marwah, S.M. Infant overnutrition in the first year of life: A field study in Dudley, Worcestershire. British Medical Journal, 1972, 4, 507-515.

Singer, J.E., Westphal, M., & Niswander, D. Relation of weight gain during pregnancy to birthweight and infant growth and development in the first year of life. Obstetrics & Gynecology, 1968, 31, 417-423.

Sleigh, G. & Ounstead, M. Present-day practice in infant feeding. The Lancet, 1975, 1, 753.

Staffieri, J.R. A study of social stereotype of body image in children. Journal of Personality and Social Psychology, 1967, 7, 101-104.

Stamler, J. The primary prevention of heart disease. Hospital Practice, 1971, 49, 1-6.

Stefanik, P.A., Heald, F.P., & Mayer, J. Caloric intake in relation to energy output of obese and nonobese adolescent boys. American Journal of Clinical Nutrition, 1959, 7, 55-62.

Stevenson, D.K., Hopper, A.O., Cohen, R.S., Bucalo, L.R., Kerner, J.A., & Sunshine, P. Macrosomia: Causes and consequences. The Journal of Pediatrics, 1982, 100, 515-520.

Stewart, R.A. & Purvis, G.A. Infantile overnutrition. British Medical Journal, 1973, 1, 738.

Stunkard, A. & Burt, V. Obesity and body image: Age at onset of disturbances in the body image. American Journal of Psychiatry, 1967, 123, 1443-1447.

Stunkard, A. & Kaplan, D. Eating in public places: A review of reports of the direct observation of eating behavior. International Journal of Obesity, 1977, 1, 89-101.

Stunkard, A.J. & Penick, S.B. Behavior modification in the treatment of obesity. Archives of General Psychiatry, 1979, 36, 801-806.

Suskind, R.M. Textbook of pediatric nutrition. New York: Raven Press, 1981.

Sveger, T., Lindberg, T., Weibull, B., & Olsson, U.L. Nutrition, overnutrition, and obesity in the first year of life in Malmö, Sweden. Acta Paediatrica Scandinavica, 1975, 64, 635-640.

Switzky, L.T., Vietze, P., & Switzky, H.N. Attitudinal and demographic predictors of breast-feeding and bottle-feeding behavior by mothers of six-week-old infants. Psychological Reports, 1979, 45, 3-14.

Taitz, L.S. Infantile overnutrition among artifically fed infants in the Sheffield Region. British Medical Journal, 1971, 1, 315-316.

Tanner, J.M. & Israelsohn, W.J. Parent-child correlations for body measurements of children between the ages of one month and seven years. Annals of Human Genetics, 1963, 26, 245-259.

Tanner, J.M. & Whitehouse, R.H. Revised standards for triceps and subscapular skinfolds in British children. Archives of Diseases in Childhood, 1975, 50, 142-145.

Thompson, J.K., Jarvie, G.J., Lahey, B.B., & Cureton, K.J. Exercise and obesity: Etiology, physiology, and intervention. Psychological Bulletin, 1982, 91, 55-79.

Trulson, M.F. Assessment of dietary study methods. Journal of the American Dietetic Association, 1954, 30, 991-995.

Udall, J.N., Harrison, G.G., Vaucher, Y., Walson, P.D., & Morrow, G. Interaction of maternal and neonatal obesity. Pediatrics, 1978, 62, 17-21.

U.S. Department of Health, Education, and Welfare. Ten-State Nutrition Survey 1968-1970 . Atlanta: DHEW Publication No. (HSM) 72-8130, Center for Disease Control, 1972.

Vuille, J.C. & Mellbin, T. Obesity in 10-year-olds: An epidemiological study. Pediatrics, 1979, 64, 564-572.

Warwick, P.M., Toft, R., & Garrow, J.S. Individual variation in energy expenditure. In G.A. Bray (Ed.), Recent advances in obesity research. London: Newmann Press, 1978.

Waxman, M. & Stunkard, A.J. Caloric intake and expenditure of obese boys. Journal of Pediatrics, 1980, 96, 187-193.

Werkman, S.L. & Greenberg, E.S. Personality and interest patterns in obese adolescent girls. Psychosomatic Medicine, 1967, 29, 72-80.

Whitelaw, A. Infant feeding and subcutaneous fat at birth and at one year. The Lancet, 1977, 2, 1098-1099.

Whitelaw, G.L. Prevalence and prognosis of obesity in infancy. In E. Cacciari, Z. Laron, & S. Raiti (Eds.), Obesity in childhood. London: Academic Press, 1978.

Widdowson, E.M. & Show, W.T. Full and empty fat cells. The Lancet, 1973, 2, 905.

Wilkinson, P.W. & Parkin, J.M. Fat cells in childhood obesity. The Lancet, 1974, 2, 1522.

Wilkinson, P.W., Parkin, J.M., Pearlson, G., Strong, H., & Sykes, P. Energy intake and physical activity in obese children. British Medical Journal, 1977, 1, 756(a).

Wilkinson, P.W., Pearlson, J., Parkin, J.M., Philips, P.R., & Sykes, P. Obesity in childhood: A community study in Newcastle Upon Tyne. The Lancet, 1977, 1, 350-352(b).

Willerman, L. Activity level and hyperactivity in twins. Child Development, 1973, 44, 288-293.

Willerman, L. & Plomin, R. Activity level in children and their parents. Child Development, 1973, 44, 854-858.

Wirtshafter, D. & Davis, J.D. Set points, settling points, and the control of body weight. Physiology and Behavior, 1977, 19, 75-78.

Wooley, S.C., Wooley, O.W., & Dyrenforth, S.P. Theoretical, practical, and social issues in behavioral treatments of obesity. Journal of Applied Behavior Analysis, 1979, 12, 3-25.

Woolridge, M.W., Baum, J.D., & Drewett, R.F. Does a change in the composition of human milk affect sucking patterns and milk intake? The Lancet, 1980, 2, 1292-1293.

Wright, P., Fawcett, J., & Crow, R. The development of differences in the feeding behavior of bottle and breast fed human infants from birth to two months. Behavioral Processes, 1980, 5, 1-20.

Yeung, D.L., Pennell, M.D., Leung, M., & Hall, J. Infant fatness and feeding practices: A longitudinal assessment. Journal of the American Dietetic Association, 1981, 79, 531-535.

Young, R.D. & Avdzej, A. The effects of obedience/disobedience and obese/nonobese body type on social acceptance by peers. The Journal of Genetic Psychology, 1979, 134, 43-49.

Zack, P.M., Harlan, W.R., Leaverton, P.E., Cornoni-Huntley, J. A longitudinal study of body fatness in childhood and adolescence. Journal of Pediatrics, 1979, 95, 126-130.

Zeskind, P.S. & Lester, B.M. Analysis of cry features in newborns with differential fetal growth. Child Development, 1981, 52, 207-212.